

REMARKS/ARGUMENTS

Favorable reconsideration of this application, in view of the above amendments and the following remarks, is respectfully requested.

Claims 9-14 and 16-20 are pending in this application. By this amendment, Claims 9-14 and 16-20 have been amended. It is respectfully submitted that no new matter has been added.

In the outstanding Office Action, Claims 16-18 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite; Claims 9-12 and 16-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Brittain et al. (U.S. Patent No. 5,450,869, hereinafter “Brittain”) in view of Fleurial et al. (U.S. Patent No. 5,610,366, hereinafter “Fleurial”); Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Brittain in view of Fleurial and further in view of Davies et al. (published European Patent Application No. 05858047 A2, hereinafter “Davies”); and Claims 19 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Brittain in view of Fleurial and further in view of Miyauchi et al. (U.S. Patent No. 6,800,963 B2, hereinafter “Miyauchi”).

Responsive to the rejection of Claims 6-18 under 35 U.S.C. § 112, second paragraph, as being indefinite, the dependency of Claim 16 has been changed so as to depend from Claim 9. It is respectfully submitted that this change in dependency clarifies the antecedent basis for the recitations in Claim 16. Accordingly, it is respectfully requested that the rejection of Claims 16-18 under 35 U.S.C. § 112, second paragraph, be reconsidered and withdrawn.

Independent Claim 9 recites “a thermoelectric converter composed of a thermoelectric semiconductor which contains, as a major component thereof, a half-Heusler-type compound.” It is respectfully submitted that these features are neither disclosed by nor

rendered obvious by Brittain, Fleurial, Davies, Miyauchi or any conceivable combination thereof.

The Office Action correctly recognizes that Brittain fails to describe “the thermoelectric converter composed of a thermoelectric semiconductor which contains, as a major component thereof, ... half-Heusler-type compound.”

Fleurial describes that a “skutterudite-type crystal lattice structure... may be used in the fabrication of thermoelectric elements.”¹ Fleurial further describes “[t]hermoelectric elements fabricated from semi-conductor materials such as IrSb₃, RhSb₃, CoSb₃, and Co_{1-x-y}Rh_x, Ir_y, Sb₃ with skutterudite-type crystal lattice structures have demonstrated a ZT of 2.”² However Fleurial fails to describe a half-Heusler-type compound. Therefore, Fleurial fails to describe a thermoelectric semiconductor which contains, as a major component thereof, a half-Heusler-type compound as recited in Claim 9.

Neither Davies nor Miyauchi correct the deficiencies of Brittain and Fleurial pointed out above. Davies describes a catalytic material 3 and a plasma 7.³ Davies states “[t]he ionized species, electrons and free radicals of the exhaust gases 8 created by the plasma are very reactive and this compensates for the low level of activity of the catalyst 3.”⁴ Miyauchi describes a thermoelectric generator,⁵ wherein the generation system comprises a voltage step-up or step-down unit (control means 15) for adjusting the generating power to a load during use.⁶ Neither Davies nor Miyauchi describes a half-Heusler-type compound. Therefore, neither Davies nor Miyauchi describes a thermoelectric semiconductor which contains, as a major component thereof, a half-Heusler-type compound as recited in Claim 9.

¹ Abstract.

² Column 3, lines 28-31.

³ Column 2, lines 8-14.

⁴ Column 2, lines 20-23.

⁵ Column 12, lines 21-42.

⁶ Fig. 6; column 10, lines 63 to column 12 line 13.

Dependent Claim 12 recites “the thermal medium on the high-temperature line is an exhaust gas subsequent to the combustion process.” It is respectfully submitted that these features are neither disclosed by nor rendered obvious by Brittain, Fleurial, Davies, Miyauchi, or any conceivable combination thereof.

The Office Action asserts that Brittain teaches “the thermo medium on the high-temperature system line is either one of a combustion gas in a combustion chamber of the combustor and an exhaust gas discharged from the combustion chamber (See col. 8 lines 1-27).” Applicants respectfully disagree.

Brittain states:

Air is drawn into compartment 34 via air pipe 42 by fan 48 and is directed into combustion chamber 36 where it is mixed with fuel being delivered via line 50 to the combustion chamber 36. Paddle wheel 52 or any like device serves to create an appropriate air-fuel mixture. Ignition device 58 fires the air-fuel mixture and combustion gases pass through hot frame cylinder 190 of generator 38, heat exchanger 40 and are exhausted through outlet 62.⁷

That is, in Brittain the exhaust gases from the combustion chamber proceed directly out through exhaust gas outlet 62. Therefore, Brittain fails to describe the thermal medium on the high-temperature line is an exhaust gas subsequent to the combustion process as recited in Claim 12.

Neither Fleurial nor Davies nor Miyauchi describes the above quoted features of Claim 12.

It is respectfully submitted that dependent Claims 10-14 and 16-20 are patentable at least for the reasons argued above with regard to Claim 9 from which they depend.

Accordingly, it is respectfully requested that the rejections of Claims 9-14 and 16-20 be reconsidered and withdrawn, and that Claims 9-14 and 16-20 be found allowable.

⁷ Column 8, lines 1-9.

It is respectfully submitted that the above amendments to Claims 9 -14 and 16-20 do not raise new issues requiring further consideration and/or search. The amendment to Claim 9 limits the claim to the already recited recitation of a half-Heusler-type compound. The amendment to Claim 16 corrects an obvious informality. The other amendments to the claims place them in a preferred form for U.S. practice. Accordingly, it is respectfully requested that this amendment be entered after final.

Consequently, for the reasons discussed in detail above, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. Therefore, a Notice of Allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below-listed telephone number.

Respectfully submitted,

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